

REMARKS

Claims 1-106 are pending in the application with claims 37-106 withdrawn from consideration as being directed to a non-elected invention. Applicant expresses appreciation for the allowance of claims 15-18 and 33-36 and for the indication that claims 14 and 32 set forth allowable subject matter.

Claims 1-13 and 19-31 stand rejected as being unpatentable over Ray. Applicant requests reconsideration.

Claim 1 sets forth a laser device that includes, among other features, an optical component separated a distance J from a target position and a laser energy source separated a distance H from the optical component. The distance H is greater than distance J. The device also includes a laser source manipulation mechanism exhibiting a mechanical resolution of positioning the laser source. The mechanical resolution is less than a spatial resolution of laser energy at the target position as directed through the optical component. Page 2 of the Office Action alleges that Ray discloses every limitation of claim 1 except that Ray does not explicitly teach the mechanical resolution being less than the spatial resolution. However, the Office Action states that Ray discusses resolution and that it would be obvious “to increase resolution for increased detection schemes.” Applicant traverses.

Establishing a prima facie case of obviousness requires that the prior art must suggest making the claimed device and teach or suggest all of the claimed limitations. Also, the prior art must reveal that those of ordinary skill would have a reasonable expectation of success of making the claimed device. Applicant asserts that it is not obvious, as alleged in the Office Action, to increase the spatial resolution of the Ray microscope so as to exceed the mechanical resolution. First, the Office Action alleges that Ray discusses overcoming the resolution limits of previous technologies. However, “resolution” as used in the context of Ray does not refer to spatial or mechanical resolution.

The terms “spatial resolution” and “mechanical resolution” are defined in paragraphs [0005], [0026], and elsewhere throughout the present specification. “Spatial resolution” refers to the minimum controlled displacement of laser energy at the target position. “Mechanical resolution” refers to the minimum controlled displacement per step of devices used to move the target position or optical components. A problem in the prior art has been that spatial resolution was limited by mechanical resolution.

A careful reading of column 1, lines 10-18 of Ray reveals that discussion of the resolution in lines 23-24 does not pertain to spatial or mechanical resolution. Instead, Ray discusses overcoming the optical resolution limits of previous techniques used for microscopes. A further reading of the remainder of Ray reveals that Ray is consistent with Applicant’s characterization of the resolution discussion in Ray as be optical resolution, but inconsistent with the Office’s characterization that Ray pertains to spatial or mechanical resolution. Thus, the Office’s statement that “mechanical adjusting and optical positioning will act in a manner to increase resolution” pertains only to increasing optical resolution. The Office Action does not properly support an allegation that Ray somehow suggests selecting or increasing spatial resolution such that it exceeds mechanical resolution, as set forth in claim 1. Thus, Ray does not suggest making the claimed device and does not teach or suggest all of the claimed limitations.

As used in the context of Ray, those of ordinary skill recognize that “resolution” (i.e., optical resolution) refers to the size of the smallest features that can be rendered visible and distinguishable. Contrary to the Office’s assertion, no teaching or suggestion exists in Ray that mechanical resolution of moving reference frame 64 is of any interest or has an influence on optical resolution. Specifically, the minimum controlled displacement of devices used to move reference frame 64, such as lateral driver 14 or vertical driver 22, is not discussed or seen to have any influence upon optical

resolution. No evidence exists that Ray necessarily discloses or suggests mechanical resolution being less than spatial resolution, as set forth in claim 1. Ray simply does not support any finding that the relationship between mechanical and spatial resolution is of interest. At least for such additional reasons, Ray does not suggest making the claimed device and does not teach or suggest all of the claimed limitations.

The Office Action alleges that lateral driver 14 and vertical driver 22 disclose the claimed laser source manipulation mechanism and that photodiodes 78 or 80 disclose the claimed target position. Accordingly, Ray must be shown by the Office to teach or suggest that the minimum controlled displacement of lateral driver 14 and vertical driver 22 is less than the minimum controlled displacement of beam segment 72 at photodiodes 78 or 80. Applicant asserts that it is impossible to discern merely from the teachings of Ray whether such is the case.

Ray does not include any discussion of an advantage to the minimum controlled displacement of beam segment 72 at photodiodes 78 or 80 being greater than the minimum controlled displacement of lateral driver 14 and vertical driver 22. It is entirely possible that it is more advantageous in the context of Ray for mechanical resolution of lateral driver 14 and vertical driver 22 to be greater than such spatial resolution. Ray does not disclose or suggest which is preferred. Ray does not suggest any advantage to the claimed feature or how microscope 10 in Ray might be somehow configured so that mechanical resolution is less than spatial resolution.

Ray must reveal that those of ordinary skill would have a reasonable expectation of success in providing a laser source manipulation mechanism where the mechanical resolution is less than the spatial resolution. However, such a feature is of no apparent concern in the context of the microscope technology discussed in Ray. Accordingly, the Office Action does not adequately support a finding that a reasonable expectation of success exists.

In keeping with the assertions herein, Ray fails to establish a prima facie case of obviousness and claim 1 is patentable over Ray. Claims 2-13 depend from claim 1 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

For example, claim 2 sets forth a vertical index and a lateral index that intersect at an origin and are defined for the optical component. The manipulation mechanism auto aligns laser aim through the origin during laser source motion. Page 3 of the Office Action alleges that lateral driver 14 and vertical driver 22 disclose the vertical and lateral index of claim 2. However, claim 2 states that the vertical and lateral index are defined for the optical component. Page 2 of the Office Action alleges that beam sizing lens 76 discloses the optical component. Clearly, lateral driver 14 and vertical driver 22 do not constitute a vertical index and a lateral index defined for beam sizing lens 76. Accordingly, Ray does not disclose or suggest every limitation of claim 2.

In addition, claim 2 states that the manipulation mechanism auto aligns laser aim through the origin during laser source motion. Page 2 of the Office Action alleges that lateral driver 14 and vertical driver 22 disclose the manipulation mechanism. However, review of Ray does not reveal any disclosure or suggestion that lateral driver 14 or vertical driver 22 auto align laser aim through the origin of intersecting vertical and lateral indices defined for beam sizing lens 76. Column 4, lines 47-48 of Ray discusses a moving frame of reference 64 created by vertical driver 22, but Ray does not discuss any relationship between frame of reference 64 and beam sizing lens 76. At least for such additional reasons, Ray does not disclose or suggest every limitation of claim 2.

Also for example, claim 3 sets forth that the laser source manipulation mechanism includes a mechanical index that has a pivot point for laser source lateral motion and a reference point for laser source vertical motion. Page 3 of the Office Action alleges that mechanical pivot 16 in Ray discloses the mechanical index having a pivot point set forth in claim 3 and alleges that it is obvious to include

some type of reference point for proper aligning and pivoting. However, claim 3 expressly states that the mechanical index has both a pivot point for laser source lateral motion and a reference point for laser source vertical motion. The Office Action does not allege and Ray does not disclose or suggest that mechanical pivot 16 also functions as a reference point for laser source vertical motion. Also, Ray does not discuss any relationship between frame of reference 64 and mechanical pivot 16. At least for such reasons, Ray fails to disclose or suggest every limitation of claim 3.

Page 3 of the Office Action alleges that the mention in column 1, lines 20-21 of Ray that some microscopes require samples to be in a vacuum chamber teaches the subject matter of claims 4 and 5. However, claim 4 sets forth, among other features, that the target position is located within a vacuum system and the laser source and an electro-mechanical part of the manipulation mechanism is located outside the vacuum system. Page 2 of the Office Action alleges that photodiodes 78 or 80 disclose the target position. The mere statement in Ray that a sample, such as sample 50, may be within a vacuum system does not constitute any teaching of whether photodiodes 78 or 80 are located within or located outside a vacuum system. Page 2 of the Office Action also alleges that laser 32 discloses the laser source and that lateral driver 14 and vertical driver 22 disclose the manipulation mechanism. Ray does not provide any suggestion as to whether laser 32, lateral driver 14, and vertical driver 22 are located within or located outside the vacuum chamber that may enclose sample 50. Clearly, Ray does not provide any teaching or suggestion on the matter and cannot be considered to disclose or suggest every limitation of claim 4.

Claim 5 sets forth that the target position is located within a vacuum chamber also within a high magnetic field that can hinder operation of electro-mechanical devices. The Office Action does not allege and Ray does not disclose or suggest any teaching of photo-diodes 78 or 80 being located

within a high magnetic field. At least for such reason, Ray does not disclose or suggest every limitation of claim 5.

Claim 10 sets forth that the laser source has a lateral rotational axis during lateral motion and a vertical rotational axis during vertical motion. The lateral axis and vertical axis intersect at an axes origin from which the laser energy emanates independent of laser source position. Page 3 of the Office Action alleges that Figs. 1, 1A, and 1C disclose the claimed axis origin from which the laser energy emanates independent of laser source position. However, page 2 of the Office Action alleges that laser 32 discloses the laser source. It is clearly apparent from Figs. 1, 1A, and 1C that laser 32 does not have a lateral rotational axis and vertical rotational axis providing an intersecting axes origin from which laser energy emanates independent of the position of laser 32.

Further, Figs. 1C, 1D, and 1E along with column 5, lines 1-49 of Ray describe a complex apparatus and method used to correct light beam path 96 emanating from optical pivot 86 along a different path in comparison to center light path 94 showing the desired path of the light beam. The very fact that correction of light beam path 96 is required and that correction varies depending upon location of probe assembly 26 demonstrates conclusively that Ray does not disclose or suggest intersecting lateral and vertical rotational axes for a laser source having an origin from which laser energy emanates independent of laser source position. At least for such reasons, Ray fails to disclose or suggest every limitation of claim 10.

Claim 11 sets forth that the mechanical resolution includes both lateral and vertical mechanical resolution and the spatial resolution includes both lateral and vertical spatial resolution. Page 3 of the Office Action alleges that Fig. 1 depicts both mechanical and spatial resolution mechanisms. However, as established above, Ray does not disclose or suggest any teachings with regard to the claim 1 limitation that mechanical resolution is less than spatial resolution at the target

position. Given the absence of such teaching in Ray, it is not seen how Ray can somehow disclose or suggest that mechanical resolution includes both lateral and vertical mechanical resolution and that spatial resolution includes both lateral and vertical spatial resolution. At least for such reasons, Ray does not disclose or suggest every limitation of claim 11.

Claim 12 sets forth that the spatial resolution approximately equals the mechanical resolution multiplied by a ratio of distance J to distance H and at least one of distance H and distance J can be altered, modifying the spatial resolution. As may be appreciated from the discussion above regarding the deficiencies of Ray as applied to claim 1, Ray fails to provide any teachings regarding a relationship between spatial resolution and mechanical resolution. Page 3 of the Office Action alleges that it is obvious to alter the ratio of distances in Ray. However, the Office Action does not allege that for microscope 10 mechanical resolution multiplied by a ratio of distance J to distance H approximately equals spatial resolution. The concepts of spatial and mechanical resolution in the context of Ray are not even suggested and the Office has not established any technical reasoning to support an allegation that spatial resolution in Ray necessarily approximately equals the mechanical resolution multiplied by a ratio of distance J to distance H. In fact, the Office Action does not even specifically identify what distances in microscope 10 of Ray the Office considers to constitute distances J or H. Thus, it is irrelevant that distances between various components in microscope 10 can be altered since no evidence has been established that altering such distances will necessarily modify spatial resolution and that spatial resolution will approximately equal the mechanical resolution multiplied by a ratio of distance J to distance H. At least for such reasons, Ray fails to disclose or suggest every limitation of claim 12.

Claim 13 sets forth that the manipulation mechanism of claim 1 includes a Peaucellier linkage. Page 3 of the Office Action states that the use of appropriate linkages is well known in the

art of mechanical control. However, whether such linkages are well known in mechanical control is irrelevant. Such linkages must be well known in the art of a laser device including a laser source manipulation mechanism. Further, 37 C.F.R. 1.104(d)(2) state that, when a rejection is based upon facts within the personal knowledge of an employee of the Office, the data shall be as specific as possible and the reference must be supported when called for by the Applicant with an affidavit of such employee. Accordingly, should the Office maintain the rejection of claim 13, Applicant hereby requests support of the Office's position with an Examiner affidavit or citation of additional art supporting such allegation. Also, Applicant requests additional detail sufficient to properly support the Office's position that a Peaucellier linkage is well known for use as a laser source manipulation mechanism in a laser device.

In keeping with Applicant's assertions above, claims 1-13 are patentable over Ray.

Claim 19 sets forth a laser device that includes, among other features, an optical component having a vertical index and a lateral index that intersect at an origin, a laser energy source aimed at the origin, and a laser source manipulation mechanism linking vertical and lateral laser source motion to the respective vertical and lateral indices and auto aligning laser aim through the origin during laser source motion. As may be appreciated from the discussion above regarding the deficiencies of Ray as applied at least to claims 1 and 2, Ray fails to disclose or suggest every limitation of claim 19. At least for such reason, claim 19 is patentable over Ray.

Claims 20-31 depend from claim 19 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. As may be appreciated from the discussion above regarding the deficiencies of Ray as applied to claims 1-13, Ray fails to disclose or suggest every limitation set forth in claims 20-31.

In addition, claim 27 sets forth that the lateral laser source motion is physically linked to the lateral index. Page 2 of the Office Action alleges that beam sizing lens 76 discloses the optical component and lateral driver 14 and vertical driver 22 disclose the manipulation mechanism. Review of Ray does not reveal any disclosure or suggestion of a lateral index for beam sizing lens 76 that is physically linked to lateral driver 14 or vertical driver 22. At least for such reason, Ray does not disclose or suggest every limitation of claim 27. Claim 28 sets forth that the vertical laser source motion is physically linked to the vertical index. Ray does not disclose or suggest any vertical index of beam sizing lens 76 that is physically linked to lateral driver 14 or vertical driver 22. At least for such reason, Ray does not disclose or suggest every limitation of claim 28.


Claim 29 sets forth that the manipulation mechanism includes an approximate center of lateral pivot for laser source motion approximately coincident with the lateral index and an approximate center of vertical pivot for laser source motion approximately coincident with the vertical index. Pages 3-4 of the Office Action allege that mechanical pivot 16 discloses the claimed lateral and/or vertical pivot for laser source motion. However, it is clearly apparent from Ray that mechanical pivot 16 does not have an approximate center that is approximately coincident with any lateral or vertical index of beam sizing lens 76. At least for such reason, Ray fails to disclose or suggest every limitation of claim 29.

Claim 30 sets forth that the manipulation mechanism includes a mechanical gimbal. Claim 31 sets forth that the manipulation mechanism includes a virtual gimbal. In accordance with Applicant's request for an Examiner affidavit with regard to claim 13, and should the Office maintain the rejection of claim 30, Applicant also requests appropriate support of the Office's position for claims 30 and 31.

Applicant asserts that claims 19-31 are patentable over Ray. Applicant requests allowance of claims 1-13 and 19-31 in the next Office Action.

Respectfully submitted,

Dated: 10 FEB 2004

By: 

Stephen R. Christian
Attorney for Applicants
Reg. No. 32,687
P.O. Box 1625
Idaho Falls, Idaho 83415-3899
(208) 526-9140